

**Brief Tutorial on POLARIS Web Services**

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**Note: throughout this document, quotations are put around literal text to be typed into the computer. PCR stands for Patient care report. NEMSIS stands for National Emergency Medical Information Systems, which is a standards organization.**

## **1. NEMSIS Data and XML**

Overview of Available Resources about NEMSIS Data

The web site [http://health.utah.gov/ems/data/polaris/dataset.html#vendor\\_compliance](http://health.utah.gov/ems/data/polaris/dataset.html#vendor_compliance) contains some relevant resources.

Inside of MS Word, Control-Click on this link or cut and paste the link into a web browser.

Inside the browser window, click on the link that says:

[List of National, Utah, and Local-option NEMSIS Elements](#).

It will bring up an Excel spreadsheet. It will bring up a list of data elements. These are the possible elements for the Polaris Web-based User Interface and the central statewide database.

XML Schemas describe the structure of allowable XML documents. Click on [EMS Dataset Schema](#) link and the heading of EMS Dataset XSDs (Version 2.2.1) contains a set of links for portions of the XML schema for EMS dataset. Click on one of the links to see the XML schema describing the allowable XML format for that portion of the data set.

Also discuss example of PCR Record.

## **2. Web Services**

From the page [http://health.utah.gov/ems/data/polaris/dataset.html#vendor\\_compliance](http://health.utah.gov/ems/data/polaris/dataset.html#vendor_compliance) , click on the [WSDL for development and testing](#) link in the browser. This brings up the WSDL.

In this discussion, there is a single web service and multiple operations that allow web service clients to send and receive data.

The WSDL defines first various ranges and codes. The ranges are used to constrain the inputs to various operations. The codes specify numeric conditions for certain inputs or results passed back the web service operation. Next, there are some complex objects defined for input and output parameters to the web service operations. Then the messages are defined, which contain parameters and also credentials for authenticating the user. Finally, there are the SOAP and port bindings.

## **3. Demonstration of Web Services**

### **3.1. SOAP UI**

There is an open source version of SoapUI that can be downloaded from [www.soapui.org](http://www.soapui.org). It is pre-installed on all computers in the lab, but it (or a different web services client) needs to be installed on the client computer, which itself may be a PC or a server.

Start SOAPUI from the Windows Start menu.

Under file menu, select “New WSDL project”

It comes up with a dialog that has three elements.

1. Enter “POLARIS Web services training” for project name.
2. Copy the URL address for the WSDL  
[http://health.utah.gov/ems/web\\_services/PolarisWS.dev.wsdl](http://health.utah.gov/ems/web_services/PolarisWS.dev.wsdl) into SoapUI using Control V.
3. Leave the checkbox checked.
4. Hit OK and then Save

You will see the project appear on the left side of the SOAP UI window. There are two versions of the SOAP standard supported, 1.1 and 1.2. We will demonstrate with 1.2.

Click on the + sign next to POLARISWSSOAP12Binding under POLARIS Web services training project. There are six web service operations:

- exportDEMO – for exporting a single agency’s demographics
- exportPCR – for exporting a single or multiple PCR records
- searchPCRs – for searching available PCRs for those matching specified criteria
- importPCR – for importing a single or multiple PCR records
- updateDemo – for updating a single agency’s demographics
- updatePCR – for updating existing single or multiple PCR records

The polarisguest users have access to all operations EXCEPT updateDemo, for the "BEMS" agency. In the class, we will focus upon the searchPCRs and export capabilities.

Click the + sign next to searchPCRs and then doubleclick on the SOAPRequest1. A user can enter fields where the defaulted values are “?” .

### **3.2. Attempt to Authenticate Web Services Client without Proper Information**

Click on the green submit triangle, and it submits the client call to the web service operation (in this case searchPCRs).

This returns an XML document that contains a privilege return code of -5, meaning that the combination of username and password is illegal.

### **3.3. Format of Web Service Operation Parameters**

Next, replace the “?” in clientname and password with “polarisguest”. Hit the green triangle again. This time, the result says, “Invalid date value: ?”. The web service client expected the parameters in a particular format, and “?” did not match the allowable date format.

The following are examples of field formats for the search parameters:

The NEMESIS\_E01\_01 element will contain a string of letters and numbers representing the index to the PCR record and consistent with the format of the PatientCareReportNumber in the NEMESIS standard. For example,  
<NEMESIS\_E01\_01>a8b1127e110b7b2a656</NEMESIS\_E01\_01>

The CreatedDateRange (lowerbound and upperbound elements) will contain a date/time. For example,

```
<CreatedDateRange>
    <lowerbound>2007-02-12T13:44:02.000-07:00</lowerbound>
    <upperbound>2007-02-12T13:44:02.000-07:00</upperbound>
</CreatedDateRange>
```

The ModifiedDateRange element will contain a date/time. For example,

```
<ModifiedDateRange>
    <lowerbound>2007-02-12T13:44:02.000-07:00</lowerbound>
    <upperbound>2007-02-12T13:44:02.000-07:00</upperbound>
</ModifiedDateRange>
```

The NEMESIS\_E23\_10 element will contain the creator of the PCR, which is represented as a string and consistent with the format of the NEMESIS CrewMemberID type. For example, <NEMESIS\_E23\_10>polarisguest</NEMESIS\_E23\_10>

The NEMESIS\_E02\_02 element will contain the incident number of the PCR (not necessarily unique), which is represented as a string and consistent with the format of the NEMESIS IncidentNumber type. For example,

```
<NEMESIS_E02_02>1234</NEMESIS_E02_02>
```

The NEMSIS\_E06\_01 element will contain the last name of the patient, which is represented either as a NEMSIS null (-5, -10, -15, -20, -25) or a string consistent with the NEMSIS LastName type. For example, <NEMSIS\_E06\_01>-25</NEMSIS\_E06\_01>

The NEMSIS\_E06\_02 element will contain the first name of the patient, which is represented either as a NEMSIS null (-5, -10, -15, -20, -25) or a string consistent with the NEMSIS FirstName type. For example, <NEMSIS\_E06\_02>-25</NEMSIS\_E06\_02>

The NEMSIS\_E08\_11 element will contain the first name of the patient, which is a string consistent with the NEMSIS StreetAddress type. For example,  
<NEMSIS\_E08\_11>120 Terry Road</NEMSIS\_E08\_11>

The NEMSIS\_E08\_12 element will contain the FIPS code for the city of the incident and is consistent with the NEMSIS City type. For example,  
<NEMSIS\_E08\_12>need to verify this format, we support whatever is in the standard</NEMSIS\_E08\_12>

The UnitNotifiedDateRange (lowerbound and upperbound elements) will contain a date. For example,

```
<UnitNotifiedDateRange>
    <lowerbound>2001-01-01-07:00</lowerbound>
    <upperbound>2001-01-01-07:00</upperbound>
</UnitNotifiedDateRange>
```

The BirthDateRange (lowerbound and upperbound elements) will contain a date. For example,

```
<BirthDateRange>
    <lowerbound>2001-01-01-07:00</lowerbound>
    <upperbound>2001-01-01-07:00</upperbound>
</BirthDateRange>
```

The PatientAge (lowerAgeBound and upperAgeBound elements) will contain integers that represent years. For example,

```
<PatientAge>
    <lowerAgeBound>1</lowerAgeBound>
    <upperAgeBound>100</upperAgeBound>
</PatientAge>
```

The NEMSIS E02\_01 element will contain the AgencyID for the agency recording the PCR, and is consistent with the NEMSIS AgencyID type. For example,  
<NEMSIS\_E02\_01>BEMS</NEMSIS\_E02\_01>

The NEMSIS E08\_13 element will contain the county code for the incident, which has five digits and is consistent with the NEMSIS CountyCode type. For example,  
<NEMSIS\_E08\_13>49035</NEMSIS\_E08\_13>

The NEMSIS E02\_12 element will contain the EMS Unit Call Sign for the incident, which is consistent with the NEMSIS EMSUnitCallSign type. For example,  
<NEMSIS\_E02\_12>1234</NEMSIS\_E02\_12>

The NEMSIS E02\_12 element will contain the EMS Agency Number for the agency entering the PCR, which is consistent with the NEMSIS EMSAgencyNumber type. For example, <NEMSIS\_E02\_01>BEMS</NEMSIS\_E02\_01>

The Complete element will contain a code (0 or 1) representing whether the PCR is complete, as specified during web-based data entry or import. For example,  
<Complete>1</Complete>

The Modified element will contain a code (0 or 1) representing whether the PCR has been modified. For example, <Modified>0</Modified>

### **3.4. Valid Search Attempt**

Remove all optional elements, except E23\_10. For E23\_10, fill in the element value as “jlegler”. The resulting SOAP message will look like

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:head="http://polaris.utah.gov/header" xmlns:typ="http://polaris.utah.gov/types">
  <soap:Header>
    <head:credentials>
      <head:clientname>polarisguest</head:clientname>
      <head:password>polarisguest</head:password>
    </head:credentials>
  </soap:Header>
  <soap:Body>
    <typ:searchPCRs>
      <typ:pcrSearchCriteria>

        <!--Optional:-->
        <typ:NEMSIS_E23_10>jlegler</typ:NEMSIS_E23_10>

      </typ:pcrSearchCriteria>
    </typ:searchPCRs>
  </soap:Body>
</soap:Envelope>
```

Click on the green triangle and it will return a list of search results.

### **3.5. Valid PCRExport**

Click on + sign next to exportPCR. Doubleclick on request1. We will take the E01\_01 value from the first search result “a8b1127e10ebf2a03fa” and use that, along with the E02\_01 value of “BEMS” to request an export of that PCR. The resulting SOAP message/request will look like:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:head="http://polaris.utah.gov/header" xmlns:typ="http://polaris.utah.gov/types">
  <soap:Header>
    <head:credentials>
      <head:clientname>polarisguest</head:clientname>
      <head:password>polarisguest</head:password>
    </head:credentials>
  </soap:Header>
  <soap:Body>
    <typ:exportPCR>
      <!--Zero or more repetitions:-->
      <typ:PCRRequestPairs>
        <typ:NEMESIS_E01_01>a8b1127e10ebf2a03fa</typ:NEMESIS_E01_01>
        <typ:NEMESIS_E02_01>BEMS</typ:NEMESIS_E02_01>
      </typ:PCRRequestPairs>
    </typ:exportPCR>
  </soap:Body>
</soap:Envelope>
```

Click the green triangle and it will return a PCR record.

### **3.6. Valid Demographics Export**

Click on + sign next to exportDEMO. Doubleclick on request1. We enter the agencyId of “BEMS” to request an export of that Demographics export. The resulting SOAP message/request will look like:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:head="http://polaris.utah.gov/header" xmlns:typ="http://polaris.utah.gov/types">
  <soap:Header>
    <head:credentials>
      <head:clientname>polarisguest</head:clientname>
      <head:password>polarisguest</head:password>
    </head:credentials>
  </soap:Header>
  <soap:Body>
    <typ:exportDEMO>
      <typ:agencyID>BEMS</typ:agencyID>
    </typ:exportDEMO>
  </soap:Body>
</soap:Envelope>
```

Click the green triangle and it will return a Demographics record.